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Title : Use of an electronic theodolite to monitor the movements of southern right whales in relation to whalewatching boats off Santa Catarina State, Southern Brazil

Category : Behavior

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Abstract : Interactions between southern right whales (Eubalaena australis) and whalewatching boats in the species' wintering ground off Santa Catarina State, Southern Brazil, were monitored in 2002 using a surveyor theodolite. 65.5 hours of encounters between mother/calf pairs and boats were recorded during 25 whalewatching cruises in five different bays. Encounters varied between 14 and 85min and operations are conducted in agreement with the national legislation. Whale-boat distance varied between <10 and 4242.1m, depending on the bay. Leg speed, linearity and reorientation rates were examined before(B), during(D) and after(A) encounters to assess the potential impact of whalewatching activities to this population. Mean leg speed varied by bay and approaching phase, from 0.9 to 2.78km/h. Significantly differences were observed in three bays (GAR: H=6.2613, p(BxA)=0.0125) and p(BxD)=0.0316; IBI: H=9.4346, p(BxD)=0.0042 and p(AxD)=0.0392; GAM: H=6.014, p(BxA)=0.0316). The observed linearity values showed that whales were mostly travelling in no constant direction (mean values <0.5) at low reorientation rates (mean rates <32 degrees/min). The predicted probabilities of whales travelling towards the boats as a function of time were also calculated and analyzed using logistic regression. Significant differences in relation to the expected values were observed at certain time intervals. Whales were observed moving towards and away from the boat both at shorter and greater distances. Data from whales' movements in no-whalewatching days were also obtained and compared with the whalewatching days. No significant differences were observed between the datasets ($p<0.05$). Although long-term impacts are difficult to assess, this work showed no clear evidence of immediate disturbance to this right whale population, suggesting that whalewatching activities can be continued in the area if conducted in agreement to the national legislation. This was the first year of use of a theodolite and the data presented here could provide a reference for future comparisons regarding whale movements in the area.